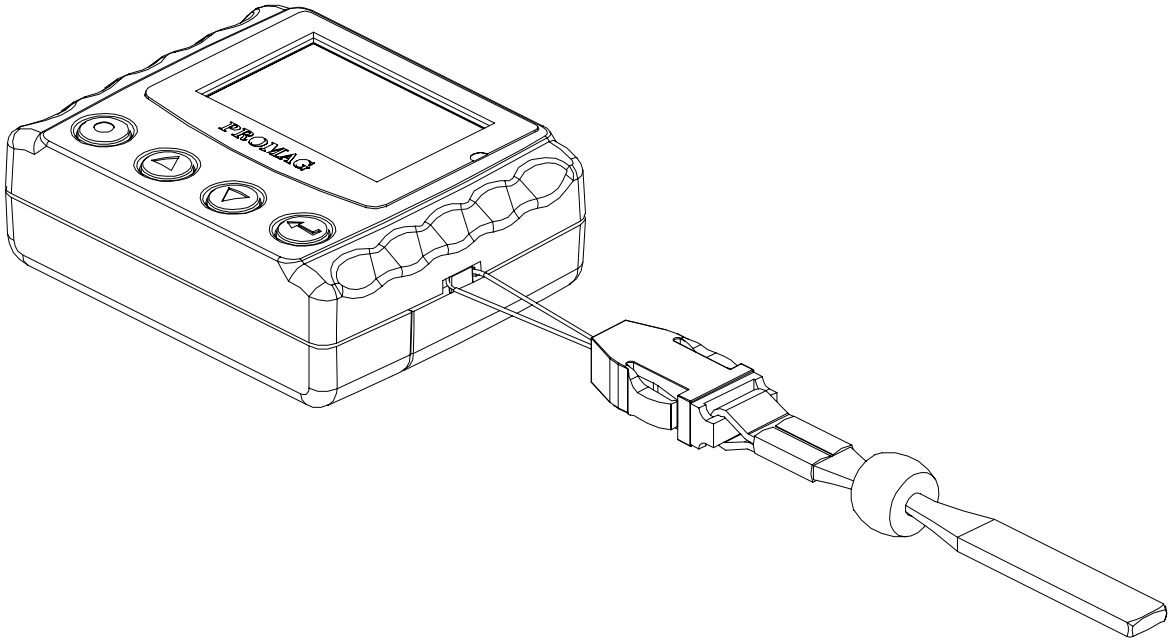
PCR120/MFR120 Series



RFID Card Reader with LCD User's Manual

Manual Part Number : TM951183 Rev : 01 **March 2007**

REGISTERED TO ISO 9001:2000

8F, No.31, Lane 169, Kang-Ning St., Hsi-Chih Taipei Hsien, 221 Taiwan
Phone: (886) 2-2695-4214
FAX: (886) 2-2695-4213
www.gigatms.com.tw

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REVISIONS

Rev Number	Date	Notes
01	March. 07	Initial Release

Contents

Information 4

Technical and Operational Description 7

Connections 13

Card Data Format 15

Specifications 16

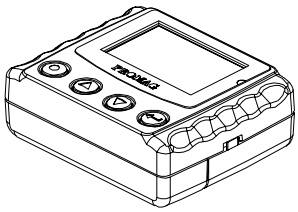
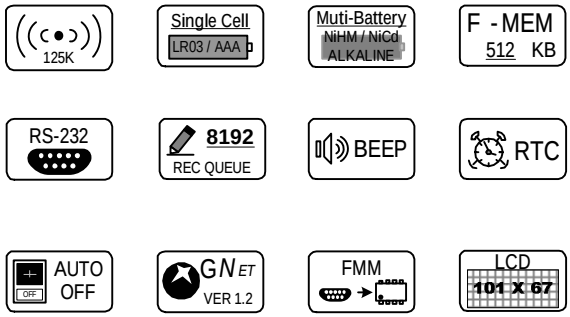
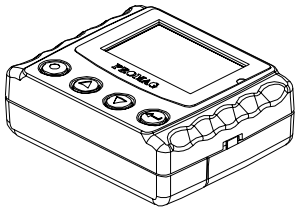
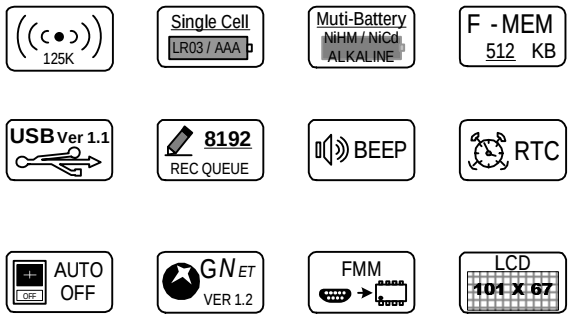
Communication Protocol 17

FCC COMPLIANCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Information

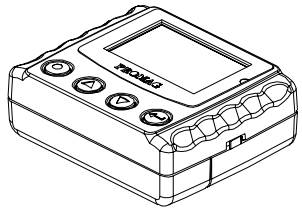
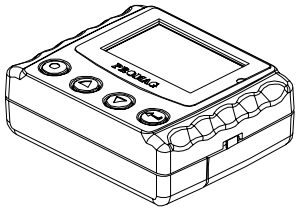
PCR120 Series 125KHz RFID Reader

MACHINE TYPE	FUNCTION
 **PCR120** **RS232 Interface**	
 **PCR120U** **USB Interface**	

Read the instructions on your device before installing batteries

1. Insert batteries into your device properly, with the (+) and (-) terminals aligned correctly.
2. Discharged batteries should be removed from equipment to prevent possible damage.
3. Store the batteries in a cool and dry place. [Batteries should be stored at temperatures between 50˚F (10˚C) and 77˚F (25˚C), with relative humidity not exceeding 65 percent. Refrigeration of alkaline batteries is not necessary because of their very good capacity retention. Excessive temperature cycling and storage at temperatures greater than 77˚F (25˚C) should be avoided to maximize shelf life.]
4. Remove batteries from the electrical device if the device is not going to be used for a long time.
5. Keep battery contact surfaces and battery compartment contacts clean by rubbing them with a clean pencil eraser or a rough cloth each time you replace batteries.
6. Keep batteries away from children. If swallowed, contact a physician at once.
7. Don't recharge a battery unless it is specifically marked "rechargeable". Attempts to recharge an alkaline battery may cause an imbalance within the cell, leading to gassing and possibly explosion on either charge or discharge cycles.
8. Don't dispose of batteries in a fire—they may rupture or leak.
9. Don't carry loose batteries in a pocket or purse with metal objects like coins, paper clips, etc. This will short-circuit the battery, generating high heat.

■ MFR120 Series 13.56MHz RFID Reader

MACHINE TYPE	FUNCTION
 **MFR120** **RS232 Interface**	13.56M; Single Cell LR03 / AAA; Muti-Battery NiHM / NiCd ALKALINE; F -MEM 512 KB; RS-232; 8192 REC QUEUE; BEEP; RTC; AUTO OFF; GNET VER 1.2; FMM; LCD 101 X 67
 **MFR120U** **USB Interface**	13.56M; Single Cell LR03 / AAA; Muti-Battery NiHM / NiCd ALKALINE; F -MEM 512 KB; USB Ver 1.1; 8192 REC QUEUE; BEEP; RTC; AUTO OFF; GNET VER 1.2; FMM; LCD 101 X 67

■ Read the instructions on your device before installing batteries

1. Insert batteries into your device properly, with the (+) and (-) terminals aligned correctly.
2. Discharged batteries should be removed from equipment to prevent possible damage.
3. Store the batteries in a cool and dry place. [Batteries should be stored at temperatures between 50˚F (10˚C) and 77˚F (25˚C), with relative humidity not exceeding 65 percent. Refrigeration of alkaline batteries is not necessary because of their very good capacity retention. Excessive temperature cycling and storage at temperatures greater than 77˚F (25˚C) should be avoided to maximize shelf life.]
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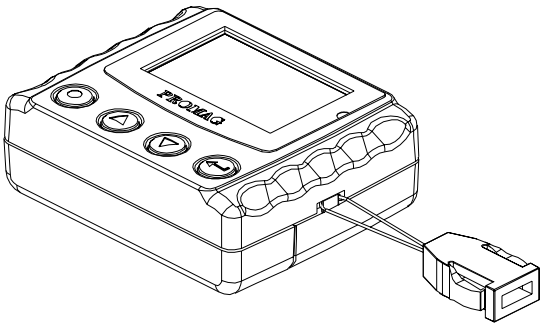
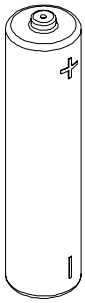
8. Don't dispose of batteries in a fire—they may rupture or leak.
9. Don't carry loose batteries in a pocket or purse with metal objects like coins, paper clips, etc. This will short-circuit the battery, generating high heat.

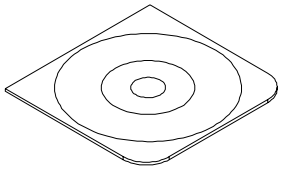
Standard Package



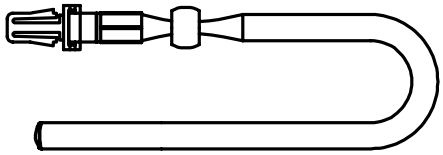
Main unit
(PCR120/MFR120)



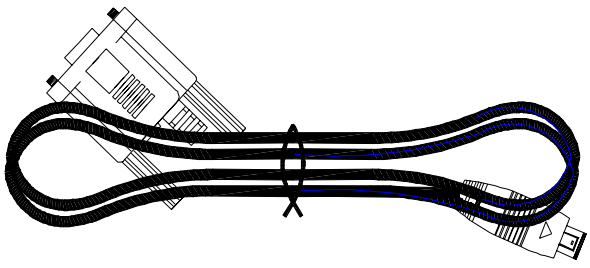
LR03-AAA ALKALINE 1.5V Battery
(BAT-T0010)



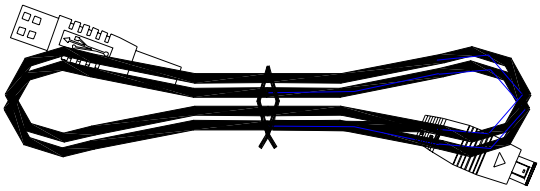
CD-ROM



Chain Sling
(TM09F1001)



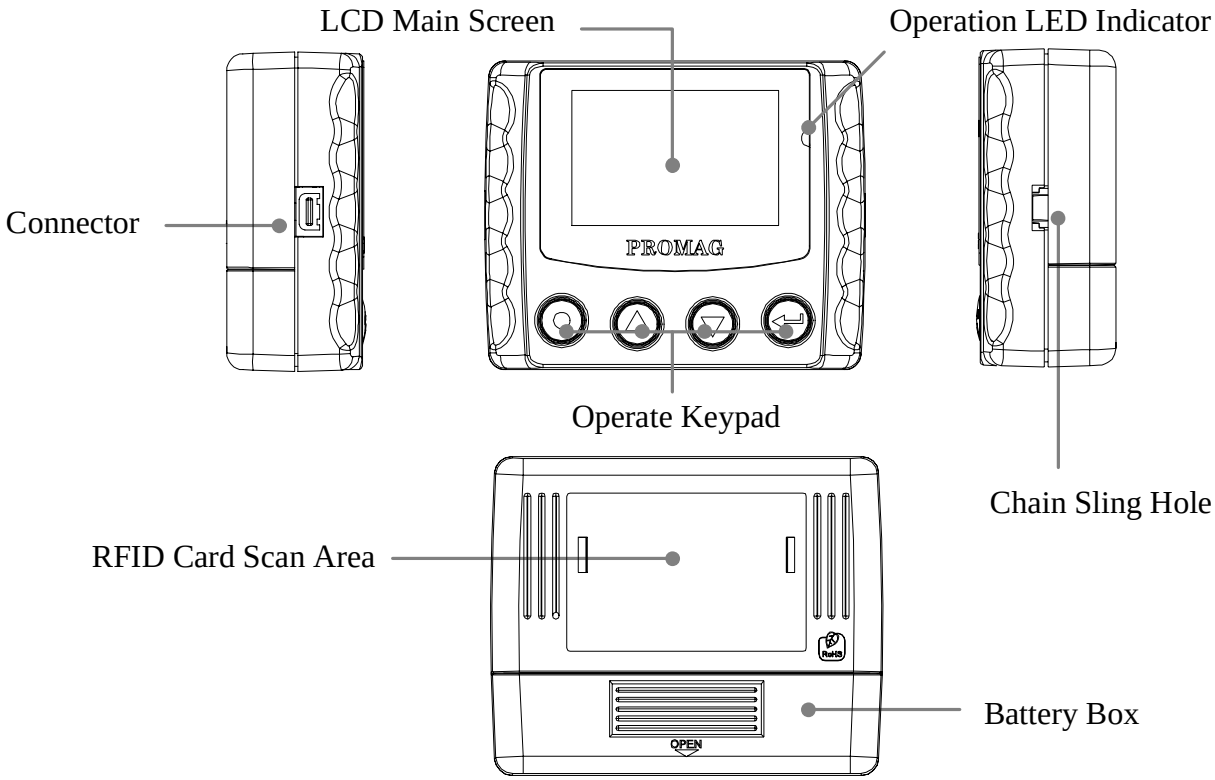
RS232 Cable for PCR120/MFR120 series
(WAS-T0017)



USB Cable for PCR120U/MFR120U series
(WAS-1571)

Technical and Operational Description

Front Panel and Operations



- **RFID Card Scan Area**
  Scan the RFID card to reader.

- **Operation LED Indicator**
  When encountering erroneous input, defective card, misread,bad memory or incorrectly encoded data and so on, the device will turn on the ERROR indicator .

- **LCD Main Screen**
  Indicating the device is ready for use low battery in operational mode.

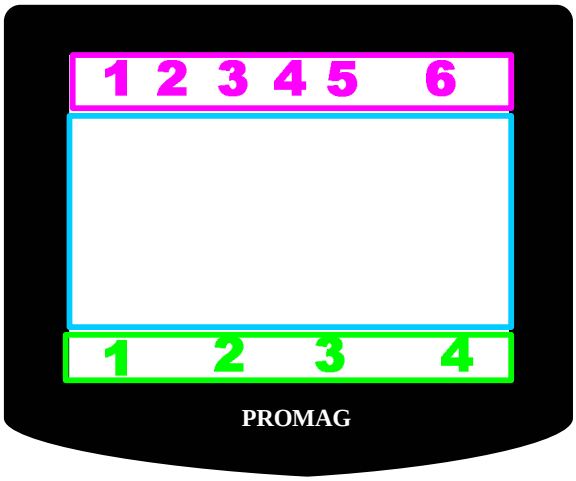
- **Connector**
  For connection to host computer and external Power .

- **Battery Box**
  Put the battery in box and hold battery .

- **Operate Keypad**
  Turn the PCR120/MFR120 on/off power and Operate.

- **Chain Sling Hole**
  Connect to chain sling.

■ LCD Display



Status Function Area

Main Display Area

Keypad Guidance Area

● Status Function Area

1. Power Status

▬	Battery Power Supply
▭	Low Battery Power Supply
▬	External Power Supply

2. Scan Status

／ or ＼	Scaning

3. Buzzer Status

♪	Buzzer ON

4. Event Status

1~9	Event

5. Decode Status

EM	EM Card Decoded
1K	Mifare 1K Card Decoded
4K	Mifare 4K Card Decoded
DS	Mifare DESFire Card Decoded
UT	Mifare Ultralight Card Decoded
FL	Felica Card Decoded

6. Guidance Number

xxxxxx	Current Record Number When Scanning or Viewing Database
x	Main Menu Item When Operating Menu
x-x	Sub-Menu Item When Operating Submenu

● Main Display Area

Display Date & Week & Time , Menu Item , Record Data , Parameter Setting , Other Information

● Keypad Guidance Area

1. Corresponding Key - ○

Power /Exit / Back / Cancel / No Key Function

2. Corresponding Key - △

Up / Up scroll / Decrease/Scan Key Function

3. Corresponding Key - ▽

Down / Down scroll / Increase/Event Key Function

4. Corresponding Key - ⏎

Menu / Enter / Save / Next / Yes Key Function

■ Function Menu

1. Profiles	**1-1. Machine ID**	Display Machine ID - 2 Characters Default : 00
	1-2. User Name	Display User Name - 16 Characters Max
	1-3. Display Format	Display Mode - ID Number
	1-4. View Mode	Set View Mode - Big or Small Default : Big
	1-5. Scan Mode	Set Scan Mode - Button or Continuous Default : Button
2. Setting	**2-1. BackLight**	Set Back Light Duration - 00 ~ 255 Seconds Default : 15 Seconds
	2-2. Auto Power Off	Set Auto Power Off Duration - 00 ~ 255 Seconds Default : 30 Seconds
	2-3. Power Mode	Set Power Mode - Switch Mode or Auto Power Off Mode Default : Switch Mode
	2-4. Sound	Set Operate Sound - ON or OFF Default : ON
	2-5. Reset	Reset Default - BackLight = 15 seconds Auto Power Off = 30 seconds Power Mode = Switch Mode Sound = ON
3. Database	**3-1. Status**	Display Memory Status - Used Space, Unused Space, Total Space
	3-2. View	Display all records in memory
4. Calendar	**4-1. Date Format**	Set Date Format Select - Year / Month / Date Date / Month / Year Month / Date / Year Default : Month / Date / Year
	4-2. Set Date/Time	Set Date - Year, Month, Date Set Time - Week, Hour, Minute, Second
5. Information	**5-1. Product Name, Product Description, Firmware Version**	

■ Display Information

Exceptional Indication

LCD Display message	Description	Counterplot
Check RTC !	The RTC is malfunctioning (After scan card)	Set Date and Time
FLASH Full !	The record already is full. (After scan card)	Download Records and Erase Records
Check FLASH !	The record can't write into the FLASH memory. (After svan card)	Contect Agent
Decode Error !	Scan Card can't decode. (After scan card)	Scah Card again or Change Card
No Record !	No Record in FLASH memory. (Enter Database -View function)	Swipe Card
Record not empty !	The FLASH memory not empty. (Enter Calendar function)	Download Records and Erase Records
ISP MODE	Enter FMM Mode (By communication command)	Update New Firmware

LED Indicator

Status	Green LED	Red LED	Buzzer	Read Card
Power On	**Take turns blink 2 times**		**Beep. Beep.**	**X**
Auto Power Off	**Take turns blink 2 times**		**Beep. Beep.**	**X**
Ready	**Off**	**Off**	**X**	**O**
Read OK	**Blink 1 time**	**Off**	**Beep.**	**X**
Read Error	**Off**	**Blink 1 time**	**Beep. Beep. Beep.**	**X**
Firmware Management Mode	**Off**	**On**	**X**	**X**

■ Operational Description

1. Powered by Battery

For normal use, the unit is powered by battery. Push the Power Switch Button "⊙" for about 2 seconds to turn on the unit. Also push the Power Switch Button "⊙" for about 2 seconds to turn off the unit at Switch Mode. After the unit is turned on, the power would be turned off automatically if there is no scanning a card on the unit in 30 seconds (default) at Auto Power Off Mode. This means the unit would be turned off if no scanning a card again in every 30 seconds (default) after every card scanning. It would have Low Battery Detect/Warning indication when the unit is powered by battery.

2. Powered by Cable

When PCR120/MFR120 is connected/disconnected to external power adapter by the WAS-T0017 RS232 cable or USB port by the WAS-1571 USB cable,, it would be turned On/Off automatically. When the unit is connected with the PC through the communication Cable (WAS-T0017 or WAS-1571) and the PC is running PCR120/MFR120 software and the unit is turned on. Then you can do the unit Setting, Configuration or data downloading. When the device is powered by cable from PC, the Power Switch would have no function and the unit would have no Low Battery Detect/Warning function.

3. Real Time Clock Setting

Before start using the unit, you must set the Real Time Clock (RTC) inside the unit to your local time. If there is no battery for quite a while or it is powered by cable for quite a while this would cause Real Time clock (RTC) malfunctioned due to no power supply. When put on the battery to turn on the unit and the Red/Green LED take turns to blinks, this means the RTC is malfunctioning and you must do the RTC time setting before you use the unit.

4. Low Battery Detect

When the device is powered by battery, it would have Low Battery Detect function. When the battery goes low, the LCD would display " ▭ " and you must change battery immediately ; otherwise, the unit would shut down any time without pre-warning.

5. Scan RFID Card

When PCR120/MFR120 is showing the status of any function on the screen, after presenting a RFID card to PCR120/ MFR120 reader, PCR120/MFR120 is displaying card ID and record(s) information on the screen immediately. When PCR120/MFR120 is not working for next card scan , PCR120/MFR120 reader will back to default screen automatically.

6. Operate for Calendar

Before setting calendar function, please delete remaining records from PCR120/MFR120 reader, if there are records in the memory of PCR120/MFR120 , your operate setting for Calendar, PCR120/MFR120 reader will display " Record no empty" on the screen.

7. Memory Full Warning

Log database memory is full. You are not able to add any new records. Free the log database memory by uploading the data to the PC.

8. Communication by WAS-T0017 (RS232 cable)

You must use external power when the PC connect to PCR120/MFR120 by WAS-T0017 RS232 cable, or else the communication is not action. You should press any key on PCR120/MFR120 until the communication is finished, if you don't use external power.

9. Firmware Management Mode (FMM)

FMM allows you to quickly upgrade your PCR120/MFR120 internal firmware via com port and also check validity of currently loaded firmware. Contact your dealer for most recent firmware upgrade files.

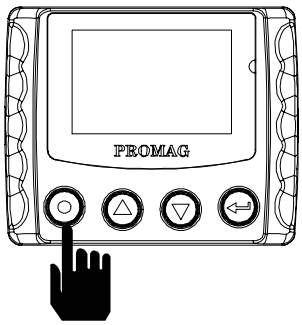
10. Database in memory

The PCR120/MFR120 allows you to manage database by software . The Logical Erase Database will logically clean the database. The Recovery Database will recover the previous erase and not yet covered database. The record pointer will return to the top of the database after any erase.

■ Replace Battery

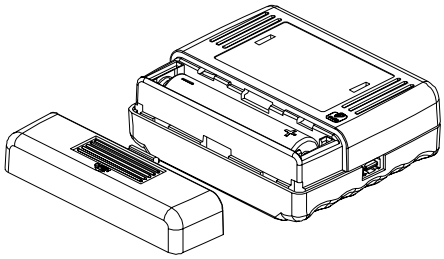
Note:

1. Read the instructions on your device before replace new battery.
2. PCR120/MFR120 can used Single-cell alkaline, nickel-cadmium (NiCd), or nickel-metal hydride
   (NiMH) Battery

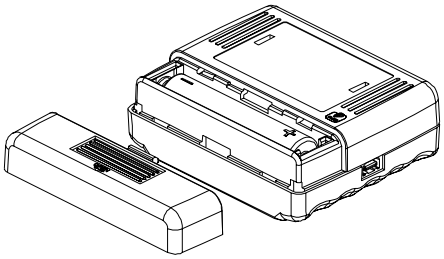


1. Power turn off

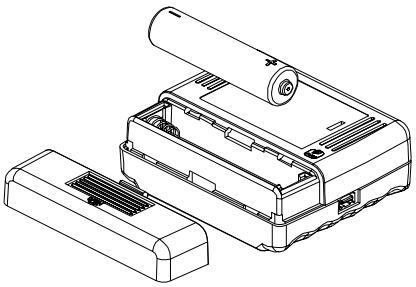
4. Take new battery



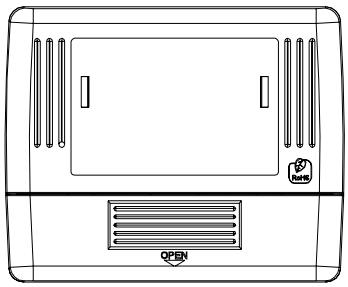
2. Take the cover away



5. Put new battery in



3. Take the battery away



6. Fix the battery cover

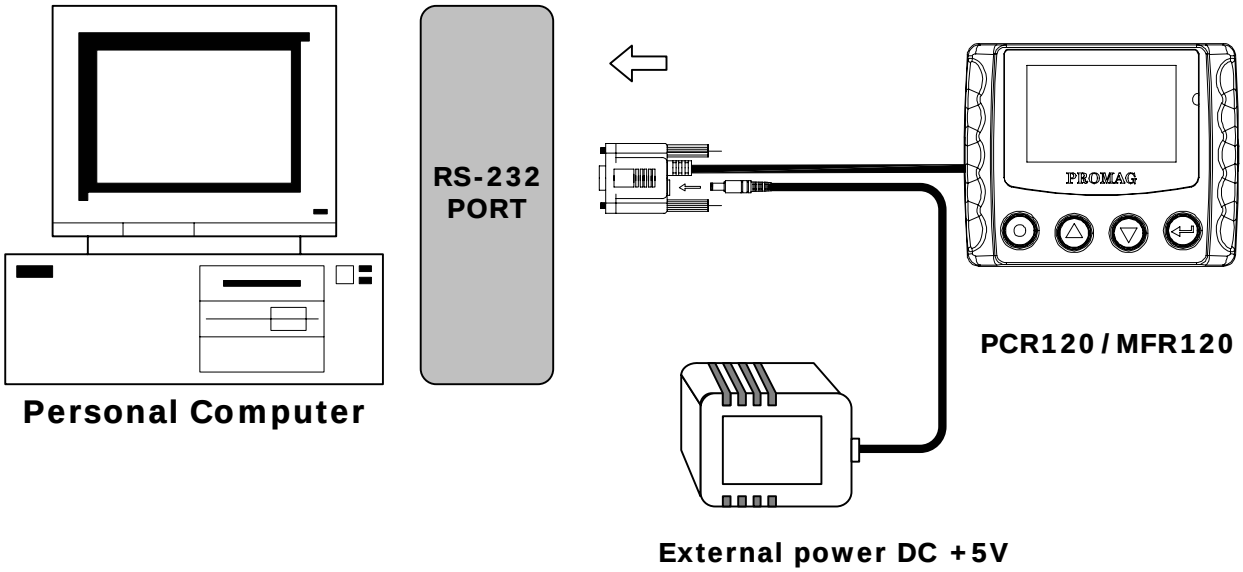
Connections

WAS-T0017 RS232 interface cable

DSUB 9P POWER JACK	DSUB 9P FEMALE PIN	FUNCTION	MINI USB 4P
+		VCC +5V	1
	2	TXD	2
	3	RXD	3
-	5	GND	4

No use

Connect to PC



Note:

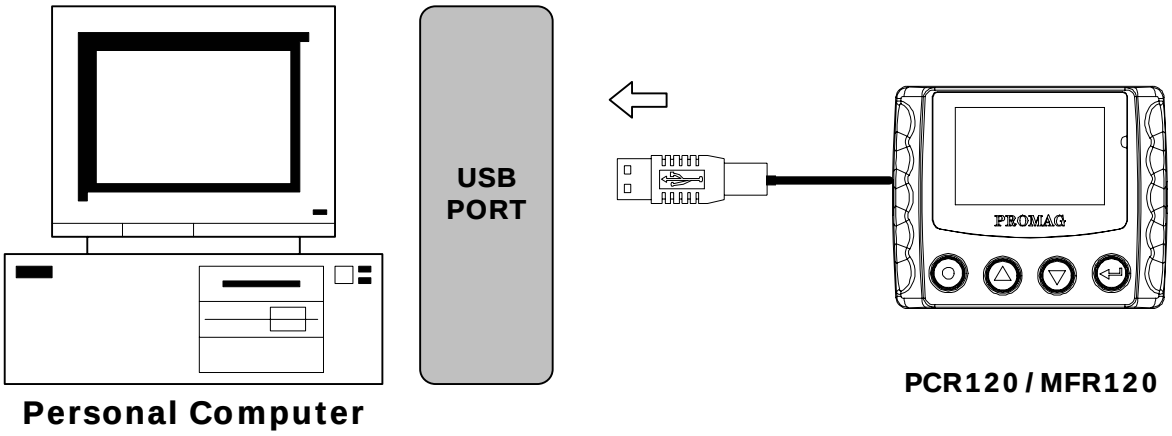
1. When PCR120/MFR120 is connected/disconnected with an external power adapter, it would be turned On/Off automatically.
2. When PCR120/MFR120 is not connected with an external power adaptor , the corresponding key for power on PCR120/MFR120 needs to be pressed all the time during the communications with the PC.

WAS-1571 USB interface cable

USB 4P FEMALE PIN	FUNCTION
1	VCC
3	D -
2	D +
4	GND

MINI USB 4P	FUNCTION
1	VCC
2	RXD
3	TXD
4	GND

Connect to PC



Personal Computer

PCR120 / MFR120

Note:
1. When PCR120/MFR120 is connected/disconnected with USB port, it would be turned On/Off automatically.

Card Data Format

CARD DATA STRING

STX	DATE & TIME	WEEK & CARD TYPE & EVENT	8 or 16 CARD ID	CR

STX	A	*DATE*	TIME	SP	WEEK	*CARD TYPE*	FC	*CARD ID*	CR

DATE & TIME

DATE	TIME	SP	WEEK
YYYY/MM/DD	HH:MM:SS	SP	W
MM/DD/YYYY	HH:MM:SS	SP	W
DD/MM/YYYY	HH:MM:SS	SP	W

1. Date have 3 formats - YYYY/MM/DD, MM/DD/YYYY, DD/MM/YYYY
2. SP is the SPACE characters (20h).
3. TIME is 24hrs .

WEEK & CARD TPYE

WEEK	
SUN	0
MON	1
TUE	2
WED	3
THU	4
FRI	5
SAT	6

CARD TYPE	
Mifare 1k	1
Mifare 4k	2
Mifare Ultrlight	3
Mifare DESFire	4
EM 125K	5
Felica	6

EVENT

EVENT CODE	EVENT
0	USER DEFINE EVENT
1	
2	
3	
4	
5	
6	
7	
8	
9	

Specifications

125KHz RFID Card for PCR120

EM compatible64 bits, ASK Manchester coding.
Reading distance 10~50mm (depends on card).

13.56MHz RFID Card for MFR120

Compatible ISO 14443A, ISO 18092.
Reading distance 10~40mm (depends on card).

RS232 Interface

RS232 , Half-Duplex , 8N1 , 9600 bps

USB Interface

Full compliance with the USB Specification V 1.1
The device uses a Virtual Serial Port Driver, making it appear to have the software like a standard RS232 Serial Port.

LCD Display

LCD type : FSTN
Dot arrangement :101 x 67 Dots Matrix LCD Module
Viewing direction : 6 O'clock

Communication Protocol :

Version 1.2 (GNET V1.2)

CLOCK

Real Time Clock (RTC) module and back-up capacitor

Memory Size for Storing Data

CMOS Serial Flash Memory 512K bytes
Up to 8192 records (32 Bytes / Record)

Battery Power

Single-cell alkaline, nickel-cadmium (NiCd), or nickel-metal hydride (NiMH) battery .

Power Supply from Cable

DC 5V , 200mA (for RS-232) or USB Powered

Dimensions

L 58 x W 20 x H 47 mm

Environment

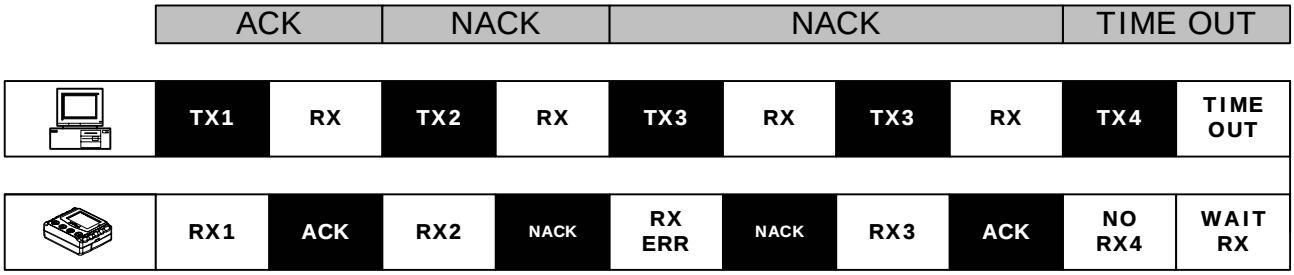
Operating Temp : 0 ~ +55℃
Storage Temp : -10 ~ +60℃
Humidity : 10 ~ 90 % relative

Mounting

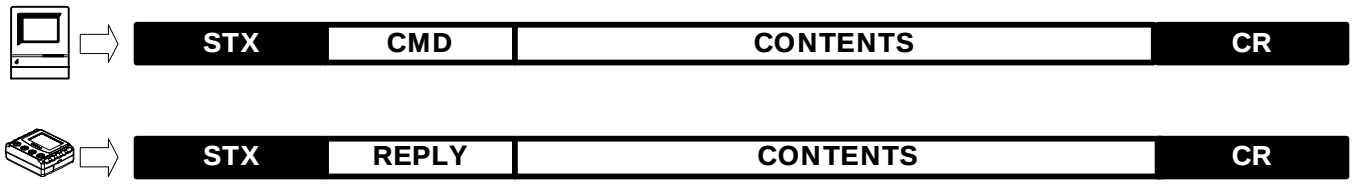
Portable or Any surface

Communication Protocol

Handshaking



PACKET



ITEM	Dec	Hex	Control Key	Function
STX	2	02	^B	Start of Text
CMD	ASCII	ASCII	ASCII	Command Code
CONTENTS	ASCII	ASCII	ASCII	Contents Data
CHKSUM	ASCII	ASCII	ASCII	Check Sum
CR	13	0d	^M	Carriage Return
REPLY	(78) 65	(4e) 41	(N) A	(Negative) Acknowledge

PCR120/MFR120 Terminal has an extensive list of Commands that allow manipulating its internal database, setting functional parameters and getting data on its current status.

There are 2 levels of access to the PCR120/MFR120 : User and Supervisor. Supervisor level is protected by a Password. Sensitive data can be downloaded or altered only on the Supervisor level. General Terminal data is available on the User level as well.

Command Index Table

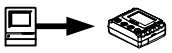
Topic	Command		Contents	Description
Access Security Command				
ACCESS	U	L	4 Characters for Login(0000)	Login
	---	O	-	Logout
	S	P	New four characters password	Set Password
Database Commands				
DATABASE	U	N	-	Get Number of Record
	S	G	Number	Read Record by Number
	S	E	-	Erase All Record
	S	R	-	Rollback Record
	S	M	-	Recovery All Record
General Commands				
SETTING	U	F	-	Get Product Version
	S	S	Date,Time,Week	Set Date,Time and Week
	U	T	-	Get Date and Time
	S	J	-	Set Machine ID
	U	I	-	Get Machine ID
	U	X	-	Enter Firmware Management Mode
	S	B	-	Get Register
	S	C	-	Set register

Reply Index Table

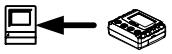
Reply	Contents
A	Reply Information
C	Checksum Error
D	Access Denied
I	Invalid Command or Data
F	Command Execution Failed
E	Database is Empty

Access Security Commands

LOGIN : (for Supervisor Access Level)



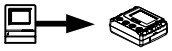
STX	L	PASSWORD	CR



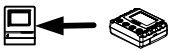
STX	A or D or I	CR

PASSWORD	4 Characters for Login. 0000=Initial value

EXAMPLE

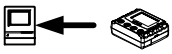


02	L	0000	0d



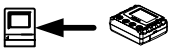
02	A	0d

Login password : 0000



02	D	0d

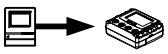
Login password command is not executed.



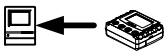
02	I	0d

Invalid password.

LOGOUT :

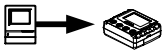


STX	O	CR

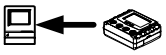


STX	A	CR

EXAMPLE



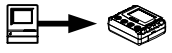
02	O	0d



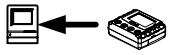
02	A	0d

Logout

SET PASSWORD :



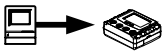
STX	P	PASSWORD	CR



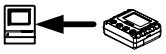
STX	A or D or I	CR

PASSWORD	New four characters password

EXAMPLE



02	P	1234	0d

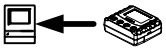


02	A	0d

Set new password : 1234

02	D	0d

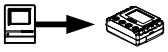
Set new password is not executed.



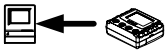
02	I	0d

Invalid password

GET NUMBER OF RECORD :



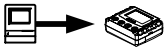
STX	N	CR



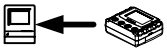
STX	A	NUMBER	CR

NUMBER	Record Count . 4 Bytes Width (0000h ~ 0800h)

EXAMPLE



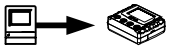
02	N	0d



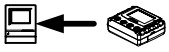
02	A	000C	0d

The total of record count : 12

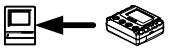
READ RECORD BY NUMBER :



STX	G	CR



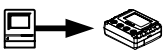
STX	A	DATE TIME	20h	DATA	CR



STX	E or D or F	CR

DATA	20h + Record Data
DATA TIME	DATE + TIME

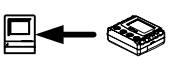
EXAMPLE



02	G	0d

02	A	11/10/2004	10:39:23	20	ABCDEF	0d

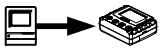
Record data : ABCDEF



02	E	0d

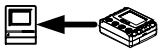
Database is empty.

ERASE ALL RECORD :



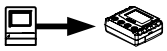
STX	E	CR

* (Erase Duration : < 60 seconds)

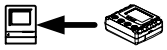


STX	A or D	CR

EXAMPLE

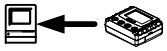


02	E	0d



02	A	0d

Erase all records.



02	D	0d

Erase command is not executed.

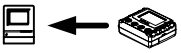
ROLLBACK DATABASE READOUT TRANSACTION :

STX	R	CR

STX	A or D	CR

EXAMPLE

02	R	0d



02	A	0d

Database is rollback.

02	D	0d

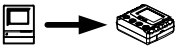
Command is not executed.

RECOVERY ALL DATABASE READOUT TRANSACTION :

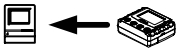
STX	M	CR

STX	A or I	CR

EXAMPLE

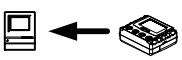


02	R	0d



02	A	0d

Database is recovery.



02	I	0d

Invalid command .

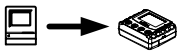
GET PRODUCT VERSION :

STX	F	CR

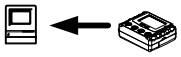
STX	A	ROM No.	VERSION	CR

ROM No.	ROM-Txxxx , xxxx : Rom serial number
VERSION	Vx.xxRm , Vx.xx : Firmware version x.xx , Rm : Modify m times

EXAMPLE



02	F	0d



02	A	ROM-T0571	,	V1.03R0	0d

ROM serial number = ROM-T0571
Firmware version = 1.03
Modify times = 0

SET DATE AND TIME :

STX	S	YYYYMMDDhhmmss	CR

STX	A or I or D	CR

YYYY	Year (2000 - 20xx)
MM	Month (01 - 12)
DD	Date (01 - 31)
hh	Hour (00 - 23)
mm	Minute (00 - 59)
ss	Second (00 - 59)

EXAMPLE

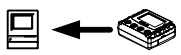
02	S	200005051230006	0d

02	A	0d

Set Date = 2000 / 5 / 5
Set Time = 12 : 30 : 00 , Saturday

02	I	0d

Invalid Date/Time



02	D	0d

Set Date/Time is not executed.

GET DATE AND TIME:

STX	T	CR

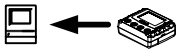
STX	A	YYYYMMDDhhmmss	CR

EXAMPLE

02	T	0d

02	A	20001108142031	0d

Get Date : 2000 / 11 / 8
Get Time : 14 : 20 : 31 , Thursday



02	F	0d

Get Date/Time is not set or invalid.

SET MACHINE ID:

STX	J	00~255	CR

STX	A or I or D	CR

EXAMPLE

02	J	00	0d

02	A	0d

Set Machine ID : 00

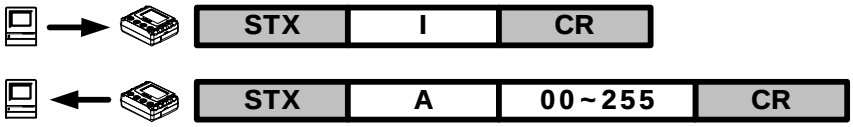
02	I	0d

Invalid command or data.

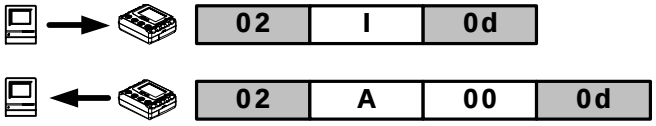
02	D	0d

Set Machine ID is not executed.

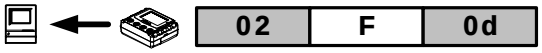
GET MACHINE :



EXAMPLE

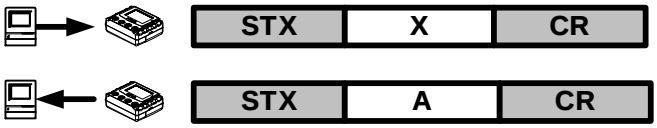


Get Machine ID : 00

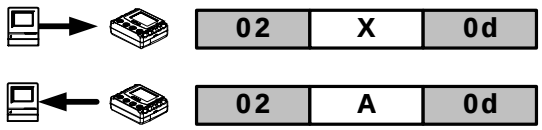


Get Identification is not set or otherwise invalid.

ENTER FIRMWARE MANAGEMENT MODE :

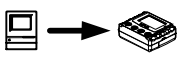


EXAMPLE



Enter firmware management mode

SET REGISTER :



STX	C	REGISTER	,	PARAM	CHKSUM	CR

STX	A	CR

REGISTER	Register Address . 2 Bytes Width (00h ~ FFh)
PARAM	Set Parameters of Register
CHKSUM	C + REGISTER + , + PARAM

GET REGISTER :

STX	B	REGSTER	CR

STX	A	PARAM	CHKSUM	CR

REGISTER	Register Address . 2 Bytes Width (00h ~ FFh)
PARAM	Set Parameters of Register

REGISTER TABLE

Register	Function	Description
10h	Auto Off Duration(Low byte)	00~FFh (0~ 255 second)
11h	Auto Off Duration(High byte)	-
12h	Power Mode	00h: Auto Power Off FFh: Switch Other: Real time
13h	Machine ID (High byte)	2 Characters
14h	Machine ID (Low byte)	
15h	RTC cal. value	00 ~ FFh
16h	*	*
17h	*	
18h	Back Light Duration	00~FFh (0~ 255 second)
19h	Buzzer	00h: Off FFh: On
1Ah	Date Format	00h: mm/dd/yyyy FFh: yyyy/mm/dd other: dd/mm/yyyy
1Bh	Display Mode	00h: Tracks Parallel 01h: Credit Card Mode other: Tracks Series
1C~1Dh	*	*
1Eh	Option of event	0~1h: only 0 event 2h: 0~1 event nh: 0~(n-1) event Max n=10 10~FFh: 0~9 event
1Fh	Scan Mode	00h: continuous Mode other: Button Mode
20~2Fh	User Name	16 Characters
30~1FBh	*	*
1FC~1FFh	Password	4 Characters